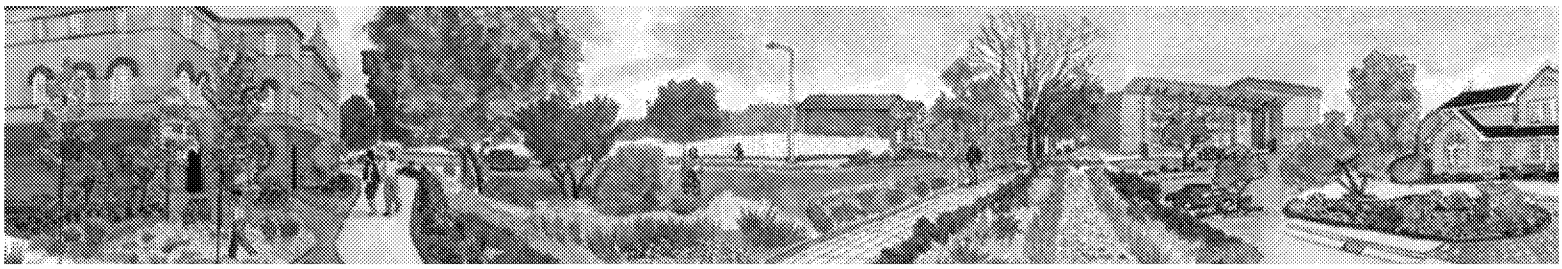

Strategy to Optimize Resource Management of Stormwater

Staff Report

Project 4b: Eliminate Barriers to Funding Stormwater Programs and Identify Funding for Stormwater Capture and Use Projects

May 31, 2018

STORMS
STORM WATER STRATEGY
CALIFORNIA WATER BOARDS

DIVISION OF WATER QUALITY

STATE WATER RESOURCES CONTROL BOARD

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY

Stormwater runoff from municipalities, industrial facilities, and construction sites can be a source of pollutants and contribute to water quality impairments in developed areas of California. Population growth and effects associated with climate change (drought, forest fires, flooding) exacerbates such impairments and increases pressure on the state to take immediate action and manage its water resources more effectively. These challenges present an opportunity to redefine how California utilizes and values stormwater as a water resource.

The Strategy to Optimize Resource Management of Stormwater (Stormwater Strategy) identifies the goals, objectives, and actions needed for the State Water Resources Control Board and nine Regional Water Quality Control Boards (collectively Water Boards) to improve the regulation, management, and utilization of California's stormwater resources.

The Stormwater Strategy identified the project to **Eliminate Barriers to Funding Stormwater Programs and Identify Funding for Stormwater Capture and Use Projects (Stormwater Funding Project)** as one of nine Phase I high-priority projects. The objective of this project is to provide recommended actions for the Water Boards to further support and promote funding of municipal stormwater projects and programs throughout the state and is the basis for this report. The recommendations also support the growing interest in using stormwater as a resource and developing multiple benefit stormwater capture and use projects.

Municipalities are required to address and control urban stormwater runoff under National Pollutant Discharge Elimination System (NPDES) permits, and the cost of compliance is a major issue among the regulated community, environmental advocacy groups, and Water Boards. Current approaches to funding municipal stormwater programs and projects are varied and generally not effective to meet regulatory requirements. While a few cities have successfully established stormwater fees to finance their programs, the overall trend in California is to finance municipal stormwater services through general funds, sometimes at the expense of other essential services, such as fire, police, trash, and libraries. Remaining funding gaps are filled via grants or other types of non-sustainable financial assistance. Low interest loans are used in some cases; however, these require applicants to demonstrate a dedicated source of revenue to pay back the loan, which is generally not feasible.

Impediments to funding stormwater programs are varied and frequently require creative solutions. Since 1996, municipalities have been limited in their ability to impose parcel-based fees to support their stormwater programs due to voter approval requirements imposed by Proposition 218. Additionally, municipalities face competitive and complex grant application processes, conflicting priorities among water purveyors and municipalities, and challenging public and/or elected officials' perceptions.

This report reviews existing supplemental financial resources that are likely to be familiar to many municipalities, such as low interest loans and grants; as well as unique and more creative funding opportunities, such as public-private partnerships and performance-based infrastructure programs. This report also identifies emerging resources and databases that may provide some additional guidance and pilot studies, such as the U.S. Environmental Protection Agency's (U.S. EPA) Water Finance Clearinghouse and the California State University Sacramento Office of Water Program's Environmental Finance Center.

Based on the challenges and opportunities evaluated in this report, and the Water Board's existing resources, eight recommendations have been developed to facilitate the State Water Resource Control Board's (State Water Board's) support of funding stormwater programs. The recommendations have been listed and grouped in order of prioritization considering timelines, likely attainment, and value to stormwater funding objectives. *Current Efforts* include low-effort actions the State Water Board is currently implementing with existing resources. *Near-Term Actions* include medium or high-effort actions that will require additional financial support or staff resources to be completed within a reasonable timeframe. *Potential Future Actions* include high-effort actions the Water Boards could undertake, but they will require significant additional staff resources and discretionary funds to be completed. Out of the eight recommended actions, the State Water Board anticipates successful completion of Recommendation 2 (in bold) to be immediately impactful, with respect to the Water Board's limited ability to address impediments to funding stormwater programs.

The overarching goal of this report is to provide a better understanding of the types of funds and financing available for stormwater management programs and projects to make the most efficient and sustainable use of *available funding.* Because of the limited amount of available funding sources compared to level of need, the State Water Board recognizes that the recommendations identified in this report can only go so far in addressing impediments to funding stormwater programs and projects. Successful completion of all eight recommendations would help, but not fully address the issue that most municipal stormwater programs are not sustainably funded. Therefore, the most impactful and effective solution is for municipalities to establish dedicated funding sources, such as fees, to finance stormwater programs.

Water Board Recommendation	Lead Entity	Level of Effort	Goal
Current Efforts			
1. Track efforts to address the Proposition 218 stormwater fee barrier, including the effects from passage of SB-231.	Water Boards	Low; achievable with existing resources	Tracking effort only; updates to be provided via executive director reports, board meeting informational items, or on the website
2. Support navigation of stormwater and dry weather flow capture projects through the Drinking Water State Revolving Fund (DWSRF) loan process and leverage insights to support other multiple benefit stormwater capture and use projects.	**Water Boards**	**Low; achievable with existing resources**	**Stormwater capture project successfully funded through the DWSRF; summary of lessons learned provided via executive director reports, board meeting informational items, or on the website**
Near-Term Actions			
3. Support the development and maintenance of a new California Stormwater Quality Association (CASQA) stormwater funding website through collaboration and feedback.	CASQA (lead); Water Boards (support)	Medium; need additional staff or discretionary funding resources	Website launched, maintained, and useful

Water Board Recommendation	Lead Entity	Level of Effort	Goal
4. Support and coordinate with U.S. EPA in their current efforts developing outreach and messaging for elected officials and the public regarding stormwater program needs/benefits; support ongoing efforts to effectively convey the relationship of stormwater management to clean water.	U.S. EPA (lead); Water Boards (support)	Medium; need additional staff or discretionary funding resources	Outreach package for distribution to elected officials and the public
5. Evaluate options to leverage the Clean Water State Revolving Fund (CWSRF) by engaging with U.S. EPA to discuss some of the creative solutions and funding programs utilized in other states. Research, review, and promote underutilized federal funding sources to leverage in coordination with state stormwater management funding programs.	Water Boards	Medium; may need additional staff resources	State Water Board offering creative, alternative funding approaches
6. Coordinate with the California Air Resources Board (ARB) to complete the development of the stormwater capture and use quantification methodology demonstrating benefits to greenhouse gas reductions through stormwater capture and use.	California ARB (lead); Water Boards(support)	Medium; may need additional staff resources for coordination efforts with ARB	Approved quantification method
Potential Future Actions			
7. Support development of local resource capacity guidance for developing a stormwater management program and consider the development of a circuit rider program to assist stormwater programs in financial planning, assessment of financial capacity, long-term program needs, and innovative financing strategies.	Water Boards (lead); U.S. EPA (support)	High; need significant staff and discretionary funding resources	Guidance document on building local resource capacity
8. Work with U.S. EPA to develop specific guidance for the incorporation of credit trading language into the municipal separate storm sewer system (MS4) and industrial stormwater permits to define compliance pathways for implementing an alternative compliance approach with clear regulatory requirements and long-term accountability.	U.S. EPA (lead); Water Boards (support)	High; need significant staff and discretionary funding resources	Guidance document for credit trading programs

2 BACKGROUND

Stormwater runoff from municipalities, industrial facilities, and construction sites can be a source of pollutants and contribute to water quality impairments in developed areas of California. Population growth and effects associated with climate change (drought, forest fires, flooding) exacerbates such impairments and increases pressure on the state to take immediate action and manage its water resources more effectively. These challenges present an opportunity to redefine how California utilizes and values stormwater as a water resource.

2.1 STORMWATER REGULATORY PROGRAM

A 1972 amendment to the federal Water Pollution Control Act (also referred to as the Clean Water Act) provides that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge complies with a National Pollutant Discharge Elimination System (NPDES) permit. The 1987 amendments to the Clean Water Act added section 402(p), which established a framework for regulating stormwater discharges under the NPDES Program. Subsequently, in 1990, U.S. EPA promulgated regulations for permitting stormwater discharges from industrial sites (including construction sites that disturb five acres or more) and from municipal separate storm sewer systems (MS4) serving a population of 100,000 people or more. These regulations, known as the Phase I regulations, require operators of medium and large MS4s to obtain stormwater permits. On December 8, 1999, U.S. EPA promulgated regulations, known as Phase II regulations, requiring permits for stormwater discharges from small MS4s and construction sites disturbing between one and five acres of land. MS4 permits issued by the State Water Board or Regional Water Quality Control Boards (Regional Water Boards) regulate stormwater entering local municipal systems under the Phase I and Phase II systems. The State Water Board also regulates stormwater discharges from California Department of Transportation (Caltrans) projects and activities. Caltrans is the largest municipal stormwater discharger in California and its linear network of highways and road facilities is regulated through one statewide Phase I MS4 Permit.

2.2 STORMWATER STRATEGY

In January 2014, Governor Brown released the California Water Action Plan which outlined a five-year roadmap to put California on the path to sustainable water management. The Water Action Plan was developed to meet three broad objectives: 1) more reliable water supplies; 2) the restoration of important species and habitat; and 3) a more resilient, sustainably managed water resources system (water supply, water quality, flood protection, and environment) that can better withstand inevitable and unforeseen pressures in the coming decades. As part of the State Water Board's efforts to address the Water Action Plan objectives, on January 6, 2016, the Board adopted Resolution No. 2016-0003, approving the Strategy to Optimize Resource Management of Stormwater (Stormwater Strategy). The Stormwater Strategy identifies goals, objectives, and actions needed for the Water Boards to improve the regulation, management, and utilization of California's stormwater resources. As described in the Water Action Plan (and identified in Action #10, "Identify Sustainable and Integrated Financing Opportunities"), the cost of compliance is a major issue among the regulated community, environmental advocacy groups, and Water Boards. To address this concern, one of the goals of the Stormwater Strategy is to identify funding impediments and provide a better understanding of the types of funds

and financing available for stormwater management projects to make the most efficient and sustainable use of available funding.

> The Stormwater Strategy identifies goals, objectives, and actions needed for the State Water Board and nine Regional Water Quality Control Boards to improve the regulation, management, and utilization of California's stormwater resources.

2.3 STORMWATER FUNDING PROJECT

The Stormwater Strategy identifies nine high-priority projects, one of which is to **Eliminate Barriers to Funding Stormwater Programs and Identify Funding for Stormwater Capture and Use Projects (Stormwater Funding Project)**. The objective of this project is to support funding of stormwater projects and programs throughout the state by addressing all four goals of the Stormwater Strategy: Goal 1 – Change the Perspective that Stormwater is a Waste or Hazard, and Treat it as a Valuable Water Resource; Goal 2 – Manage Stormwater to Preserve Watershed Processes and Achieve Desired Water Quality and Environmental Outcomes ; Goal 3 – Implement Efficient and Effective Regulatory Programs; and Goal 4 - Collaborate in Order to Solve Water Quality and Pollutant Problems with an Array of Regulatory and Non-Regulatory Approaches.

2.3.1 Stormwater Funding Project Work Team

One of the implementation actions identified in the Stormwater Strategy is creation of a Stormwater Strategy Core Implementation Committee (Core Implementation Committee), which consists of representatives from:

- California Stormwater Quality Association (CASQA);
- California Coastkeeper Alliance (CCKA);
- California Coalition for Environmental and Economic Balance (CCEEB);
- Association of California Water Agencies (ACWA); and
- California Association of Sanitation Agencies (CASA).

The Core Implementation Committee is a coordinating and advisory body that provides a forum for information exchange, consideration of Stormwater Strategy project challenges and improvements, and development of collective feedback and recommendations to the State Water Board.

All members of the volunteer Core Implementation Committee recognize the need to address funding of stormwater management as the primary impediment to support the other projects identified in the Stormwater Strategy and to support implementation of the Stormwater Funding Project. To focus these efforts, the Core Implementation Committee organized an additional subcommittee, the Stormwater Funding Barriers Subcommittee, and hosted an initial meeting on September 6, 2016, to discuss the scope of the subcommittee and identify additional stakeholders, including U.S. EPA Region 9,

municipalities, and consultants. The new subcommittee held a kick-off meeting with all the identified additional stakeholders on October 11, 2016, and subsequent meetings are held quarterly.

2.3.2 Stormwater Funding Outreach

The State Water Board and the Stormwater Funding Project Work Team conducted the following outreach efforts to identify funding solutions through workshops, conferences, seminars and other information sharing opportunities.

2.3.2.1 CASQA 2016 Conference

State Water Board staff presented an update on the Stormwater Funding Project at the 2016 CASQA Conference in San Diego. The presentation covered the funding impediments that prevent stormwater permittees from developing an effective stormwater program and outlined the multiple funding strategies that were being reviewed as part of the Stormwater Funding Project to improve access to funding in the future.

2.3.2.2 Bay Area Stormwater Management Agencies Association: Sustainable Streets

State Water Board staff participated in the Regional Roundtable on Sustainable Streets discussion on transportation, air and water resources, and climate change in early 2017. The roundtable is led by the Bay Area Stormwater Management Agencies Association (BASMAA). The goal of the roundtable is to identify obstacles and policy solutions supporting Complete Street projects, including green infrastructure that manages stormwater runoff and increases urban greening.

First, the roundtable covered the components involved with a Complete Street project, including street function, bike paths, pedestrian-friendly, urban greening, utilities, public transit, and stormwater management features. The group recognized that green infrastructure integrates very well with active transportation improvements, but funding opportunities are siloed resulting in a disjointed project funding process. As a result, a green street project is unlikely to leverage multiple, eligible funding sources.

Second, the roundtable outlined challenges to implementing a complete street. There are multiple grant funding opportunities to cover individual components of a complete street, but there is a lack of coordination amongst those funding programs resulting in different funding cycles, project objectives, grant applications, ineligible costs or match, grant reporting requirements and deliverables. As a result, the roundtable has developed a roadmap with Specific Actions to coordinate the funding of complete streets into a coordinated opportunity to leverage multiple grant sources and address a variety of complete street priorities, including some actions directed toward the Water Boards. They will be finalizing the *Roadmap of Funding Solutions for Sustainable Streets* report in spring/summer 2018.

2.3.2.3 Stormwater Finance Forums

The U.S. EPA Water Infrastructure and Resiliency Finance Center, State Water Board, and Sacramento State Environmental Finance Center co-sponsored a pair of one-day forums to discuss municipal stormwater finance issues, sources, and strategies. The forums were held in northern and southern California in April of 2017. The forums addressed important challenges municipal program managers face in building financial capacity, including:

- Key questions every local program manager must ask and answer before seeking funding;
- Defining program scope and funding needs;
- Developing stormwater program finance plans and budgets;
- Overcoming challenges to stormwater funding;

- Identifying funding sources for capital and Operation and Maintenance (O&M) needs; and
- Funding multi-purpose projects that address stormwater quality and other goals.

The stormwater management funding challenges were addressed through presentations by representatives from the state and federal government, including State Water Board Member Steven Moore, municipalities, and environmental consultants. The topics covered included:

- Performance-based contracting, public-private partnerships, and measurements and approaches used to achieve desired outcomes;
- How to engage the public and other stakeholders to sell the need for stormwater management;
- Initiating and developing public support for city fees, general fund, and other municipal funding sources; and
- Innovative and alternative funding sources.

After the event, attendees were given a series of questions to reflect on the progress made at the forum and given the opportunity to recommend additional topics that they felt were not adequately addressed as part of the forum. The topics that attendees thought deserved further exploration included:

- Develop funding sources to support groundwater recharge projects through stormwater capture;
- Maximize and leverage public funding through public-private partnerships;
- Support a public information campaign to improve messaging;
- Educate elected officials on stormwater management needs; and
- Develop a stormwater program development toolbox for capacity building.

2.3.2.4 Stormwater Strategy Seminar Series: Municipal Finance of Stormwater Projects

Municipalities throughout California face limitations in creating dedicated funding streams for stormwater management. There are a variety of legislative efforts, legal cases, and ballot measures that underlie these financial constraints. In light of the many challenges and legal complexities to funding stormwater programs, the State Water Board invited attorney Michael Colantuono, a leading expert on the law of California local government revenues, to speak in Sacramento on April 20, 2017 as part of the Stormwater Strategy Seminar Series. The seminar explored some of the legal cases and ongoing efforts to address the municipal finance of stormwater projects.

2.3.2.5 Water in the West: Innovative Water Finance Roundtable

State Water Board staff attended Stanford University's *Water in the West and the Governor's Office of Planning and Research's Innovative Financing Roundtable* (June 6, 2017) to address the need for new, innovative, and integrated financing options for safe drinking water access, management of stormwater, protection of upper watersheds, ecosystem management, and integrated resource management. The roundtable discussed underfunded water priorities and gaps, innovative and alternative ways to fund some of these inter-connected water management needs, and next steps to continue the conversation.

2.3.2.6 American River Basin Stormwater Resource Plan

The State Water Board is participating in the development of the Stormwater Resource Plan for the American River Basin. The Stormwater Resource Plan evaluates the stormwater management needs and opportunities of the American River Basin and brings together the stormwater management interests of multiple agencies to develop a prioritized list of potential projects. The Stormwater Resource Plan is being developed consistent with the requirements of Senate Bill 985, discussed further

in Section 3.3, and includes a list of multiple benefit projects eligible for future voter-approved bond-funded grant programs.

2.3.2.7 CASQA 2017 Conference

At the 2017 CASQA Conference, State Water Board staff participated in the training workshop *Financing: Bridging the Great Funding Divide*. The training workshop discussed how municipalities got into the current funding situation and what can be done to solve funding challenges. The workshop examined several possible funding sources that may be used individually or in combination to fund stormwater programs now and in the future. During the CASQA Conference, State Water Board staff also provided an update on all the Stormwater Strategy projects.

3 STORMWATER PROGRAM FUNDING – CURRENT LANDSCAPE

Stormwater runoff from the built environment remains one of the great challenges of modern water pollution control, as this source of contamination is a principal contributor to water quality impairment of waterbodies nationwide. In recognition of the need for improved control measures, in 1987 the U.S. Congress mandated U.S. EPA, under amendments to the Clean Water Act, to control certain stormwater discharges under the NPDES permit program.

Stormwater management has historically been the disposal of stormwater as quickly as possible to the nearest receiving water. Since stormwater's impact on human health is less direct and tangible, stormwater management has trailed the higher priority management of drinking water, flood control, and wastewater. In developing a municipal stormwater management program that complies with the NPDES permit, many stormwater systems must be reconfigured away from the speedy discharge to a receiving water, and toward a system that mimics natural hydrology. This approach to stormwater management will likely require the implementation of projects that are not highly compatible with existing infrastructure and may result in expensive retrofit stormwater management projects.

3.1 MS4 PERMIT IMPLEMENTATION COST ESTIMATES

MS4 permittees subject to NPDES permits are required to reduce the pollutants in stormwater discharges to the maximum extent practicable (MEP). The regulations require the implementation of best management practices (BMPs) to meet the MEP discharge standard. BMPs include both source controls and treatment measures, and MS4 permittees are required to implement an effective combination of these BMPs to reduce pollutants in stormwater discharges. MS4 permittees are also subject to any other requirements the state determines are appropriate for the control of pollutants. In California, MS4 permits also require permittees to reduce the discharge of pollutants so that water quality standards are met.

The cost to implement BMPs has been the basis for several lawsuits and petitions challenging the California stormwater regulatory program (OWP, 2005), including current litigation in the Los Angeles region[1] (*Cities of Duarte and Huntington Park v. State Water Board Et al.* Orange County, Superior Court

[1] There are additionally ongoing administrative and court proceedings on whether some of the MS4 permit requirements constitute unfunded mandates subject to reimbursement under the California constitution. The California Supreme Court issued a decision in Department of Finance v. Commission on State Mandates, 1 Cal.5th

Orange County, No. 30-2016-00833614-CU-WM-CJC, and *City of Gardena v. Los Angeles Water Board et al.*, Superior Court Orange County, No. 30-2016-00833722). A report prepared by the Public Policy Institute of California (PPIC) (2014) estimated that, in California, the total annual costs of meeting urban stormwater permit requirements are in the range of $1 billion to $1.5 billion. Agencies have stable funding for no more than half that amount, leaving a gap of $500 million to $800 million per year, or roughly $40 to $60 per household, indicating that current approaches to funding stormwater management in California are not meeting the need (PPIC, 2014).

In the Fact Sheet for the Los Angeles County MS4 Permit,[2] the Los Angeles Regional Water Board acknowledged that permittees, with limited staff and resources, would incur significant costs in implementing the permit. The economic impacts of implementing the permit were evaluated by examining data self-reported by permittees in their annual reports and a State Water Board funded study of the costs of MS4 program implementation statewide (OWP, 2005). The economic impact to public agencies was tabulated based on the reported costs of implementing the six required minimum control measures,[3] as well as costs associated with program management, monitoring programs, and a category described as "other." Based on reported values, the average annual cost to the Phase I MS4 Permittees in 2010-11 was $4,090,876 with a median cost of $687,633. However, the true cost of municipal MS4 programs could not be determined due to several factors, including, but not limited to:

- Highly variable factors and unknown level of implementation among different municipalities;
- Inconsistencies in reporting by permittees; and
- Inability to isolate program costs attributable to permit compliance. Reported costs of compliance for the same program element can vary widely from permittee to permittee.

Bearing in mind the economic considerations above, the Fact Sheet concluded that the MS4 Permit provided permittees flexibility to address critical water quality priorities in a focused and cost-effective manner while maintaining the level of water quality protection mandated by the Clean Water Act and other applicable requirements.

Furthermore, the State Water Board Study (OWP, 2005) concluded that cost information is crucial in making management decisions regarding stormwater requirements. The State Water Board Study recommended that annual reports required under MS4 permits throughout the State follow a standard format for cost reporting and that costs for all MS4 program activities (per program area) be identified as existing, enhanced, or new to the extent that the activity was required under the previous permit, is enhanced by the permit, or is exclusively a result of compliance efforts with new provisions of the MS4 permit. Consistent and accurate estimates of costs and benefits for individual types of BMPs would also

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749 (2016), and several cases are being heard by the Commission on State Mandates and the trial and appellate courts.

[2]Los Angeles Regional Water Board Order No. R4-2012-0175, as amended by Order WQ 2015-0075, NPDES NO. CAS004001.

[3]Public Information and Participation, Industrial/Commercial Facilities Control, Development Planning, Development Construction, Public Agency Activities, and Illicit Connections and Illicit Discharges Elimination (40 CFR section 122.26(d)(2)(iv)).

assist in performing robust cost-benefit analyses that, in the past, have been based largely on inadequate data.[4]

According to the March 2018 State Auditor's Report,[5] the Water Boards lack consistent information on the costs that local jurisdictions incur in complying with stormwater requirements, likely due to the lack of State Water Board guidance to local jurisdictions on how to track or report their stormwater management expenditures. The report concludes that until such guidance is prepared and disseminated, the information that Regional Water Boards receive from local jurisdictions will continue to be inconsistent, and the Regional Water Boards will not be able to thoroughly evaluate the effects of the requirements they impose on local jurisdictions or local jurisdictions' ability to pay for those efforts.

3.2 Current Approaches to Funding Stormwater Programs

MS4 permit compliance can be cost prohibitive for many California agencies given their existing resources. According to a report prepared by the PPIC (2014), California is already failing to meet societal objectives with respect to flood protection, stormwater management, and aquatic ecosystem management, owing to overwhelming legal constraints on local and regional funding. The report concluded that reasons for failure include high costs and inadequate community resources, outdated cost-sharing arrangement with the federal government, and lack of a clear "fiscal home" – either unclear lines of responsibility for addressing the problem (in the case of ecosystems) or funding rules at odds with assigned responsibility (in the case of stormwater).

Several cities, such as San Clemente, Palo Alto, and Culver City, have been successful in adopting special fees or other mechanisms to finance stormwater management programs and implementing MS4 permit requirements. However, the majority have relied on general funds, usually at the expense of other critical public services, due largely to the strict restrictions on municipalities' ability to assess fees or raise rates (Watson & Farfsing, 2014). A 2017 U.S. EPA survey[6] of municipal stormwater program managers and staff across California found that stormwater programs are currently financed primarily through means other than dedicated stormwater fees (16%). These non-dedicated and alternative fund sources consist of general funds (41%), local fees (23%), grants (15%), and other (6%). The survey also found that respondents anticipated funding strategies in the next year to consist primarily of grants (61%), followed by other local fees (11%), stormwater fees (6%), loans (4%), general fund (4%), and other (10%).

It is notable that a majority (61%) of respondents indicated that they anticipated grants to be the primary funding strategy for their program in the following year. Grant funds are typically designed to fund capital projects and not operations and maintenance (O&M), have a local match requirement, and are awarded through a highly competitive process that requires significant resources to prepare and

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[4]U.S. EPA, 2013. "Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs." EPA 841-R-13-004.

[5] California State Auditor Report 2017-18, March 2018.

[6] On April 3 and 5, 2017, U.S. EPA Region 9 and the Environmental Finance Center at CSU Sacramento hosted a finance forum titled *Water as Resource: Financing Opportunities for Municipal Stormwater Management* in Los Angeles, and Oakland. There were 342 respondents to an informal survey sent out with registration materials prior to the forums. http://www.efc.csus.edu/presentations/20170403-los-angeles/01-LA-Gebhardt.pdf

implement. While grants can provide a significant opportunity to fund a specific project, relying on future grants is not a sustainable strategy to funding stormwater programs.

3.3 U.S. EPA Efforts to Support Funding Stormwater Programs

U.S. EPA maintains a library of resources for agencies seeking assistance in funding their stormwater programs, including searchable databases of grants, loans, and cost-sharing resources, fact sheets and U.S. EPA-prepared guidance documents. U.S. EPA's online Water Infrastructure and Resiliency Finance Center[7] provides these resources to help local decision makers make informed decisions for drinking water, wastewater, and stormwater infrastructure to protect human health and the environment. This section gives a brief overview and description of some of U.S. EPA's stormwater program financing resources and guides.

Early and effective stormwater planning and management by communities as they develop can provide significant long-term cost savings while supporting resilience, economic growth, and quality of life. To accomplish this, communities can develop a comprehensive long-term community stormwater plan that integrates stormwater management with communities' broader plans for economic development, infrastructure investment, and environmental compliance. Through this approach, communities can prioritize actions related to stormwater management as part of capital improvement plans, integrated plans, masterplans, or other planning efforts.[8]

3.3.1 Asset Management and Capital Improvement Planning

In asset management planning, a community or municipality identifies asset inventories, O&M tasks and costs, and a long-range financial plan. This planning effort allows municipalities to forecast needs for complying with regulatory requirements while maintaining consistent levels of service.[9] Case studies examining stormwater asset management planning in three different regions are provided on U.S. EPA's website.[10]

> California is already failing to meet societal objectives with respect to flood protection, stormwater management, and aquatic ecosystem management, owing to overwhelming legal constraints on local and regional funding.
>
> PPIC, 2014

Taking asset management planning a step further, capital improvement planning consists of creating a more focused multi-year document to identify and prioritize capital projects, identify funding sources, and set timelines. A typical approach to capital improvement planning includes three steps: 1) use an asset management plan to plan for capital expenses in the long term (~20 years);

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[7] https://www.epa.gov/waterfinancecenter

[8] U.S. EPA Office of Water, 2016. "Community Solutions for Stormwater Management. A Guide for Voluntary Long-Term Planning."

[9] U.S. EPA Region 9, 2014. "Asset Management, Incorporating Asset Management Planning Provisions into NPDES Permits."

[10] https://www3.epa.gov/region9/water/npdes/asset-mgmnt/index.html

2) create a capital improvement plan with a narrower timeline (~5 years) in more detail, that specifies projects, costs, and funding sources; and 3) create a capital improvement budget that spans 1-2 years that commits funds for the planned capital projects.[11]

3.3.2 Financial Capability Planning and Capacity Development

A Financial Capability Assessment (FCA) is an analysis of a community's ability to pay for and deliver water services. It considers various measures of a household's ability to pay for services, and the community's financial ability to deliver those services. The FCA should be developed using U.S. EPA's FCA guidance (1997, 2014)[12,13] and should focus on stormwater and wastewater requirements, but may also consider drinking water/flood control concerns.[14] The FCA considers a wide range of financial capacity indicators to determine residential capability (median household income (MHI)) and financial strength of the permittee organization. The assessment of financial strength considers bond ratings, debt, MHI, unemployment rate, tax revenue, and property tax rates, and local data for these indicators are compared against benchmarks.

To clarify the definition of community affordability of clean water as part of the FCA, the National Academy of Public Administration (NAPA) was contracted by U.S. EPA to: highlight best practices for integrated planning, identify innovative solutions to further address affordability by lowering costs, and discuss the best approaches to analyze costs and benefits. The guidance is available in the NAPA publication, *Developing a New Framework for Community Affordability of Clean Water Services.*[15] The report includes 21 recommendations to address the challenges and opportunities for delivering clean and affordable water.

In addition to financial capability planning, overall capacity development planning at the local level can also be used to take on these efforts. The National Capacity Development Program was created under the Safe Drinking Water Act Amendments of 1996. It was designed to focus available resources toward assisting public drinking water systems in acquiring and maintaining the technical, managerial, and financial capacity to comply with public health protection standards for safe drinking water.[16] While this program was originally developed to address drinking water, there is an opportunity for stormwater projects and programs that augment drinking water supplies to participate in the program and receive DWSRF funds. Further, this would provide an opportunity for municipalities to incorporate stormwater in their overall capacity development planning efforts to create a more comprehensive program.

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[11] https://efc.sog.unc.edu/sites/www.efc.sog.unc.edu/files/Berahzer_AssetManagementOverview_for%20web_0.pdf

[12] U.S. EPA Office of Water, Office of Wastewater Management, 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Scheduled Development."

[13] U.S. EPA Office of Water, 2014. "Financial Capability Assessment Framework."

[14] U.S. EPA's FCA Guidance was developed for combined sewer system overflow systems, so not all of the guidance may be relevant for a stormwater program analysis.

[15] https://www.napawash.org/uploads/Academy_Studies/NAPA_EPA_FINAL_REPORT_110117.pdf

[16] U.S. EPA Office of Water, 2008. "National Capacity Development Strategic Plan." EPA 816-K-07-003.

3.4 STORMWATER RESOURCE PLANS

Many municipalities are involved in development of Stormwater Resource Plans to be eligible for bond funds (including Proposition 1) for stormwater and dry weather runoff capture projects. As required by Water Code sections 10560 et seq. (as amended by Senate Bill 985, Stats. 2014, ch. 555, §5), public agencies must develop Stormwater Resource Plans and comply with certain provisions to receive grants for stormwater and dry weather runoff capture projects from any bond act approved by the voters after January 1, 2014. As described in the State Water Board's Stormwater Resource Plan Guidelines,[17] Stormwater Resource Plans are required to use stormwater and dry weather runoff as a resource, prioritize multiple benefit projects within the watershed, and use public space for projects, when possible.

Public agencies developing such plans are also highly encouraged to coordinate planning efforts with other local agencies and stakeholders in the watershed and surrounding communities, including non-governmental organizations, the regulated community, and water purveyors. Coordination among participants will provide more opportunities for securing grants from varied sources, and it could also provide more opportunities to leverage financial resources between the members. In their current form, the Stormwater Resource Plan Guidelines do not include financial capacity evaluation criteria for the construction and maintenance of the prioritized projects. However, these financial planning requirements are essential for plan implementation and may be considered for inclusion in any updates to the Stormwater Resource Plan Guidelines.

3.5 TRANSPORTATION INFRASTRUCTURE

The development of streets, roads, and highways remains rooted in traditional building standards resulting in designs independent of water quality interests. With vehicles generating heavy metals and hydrocarbons at the local level (cities and counties) and statewide (Caltrans), there is an ongoing need to improve the way stormwater is managed in coordination with transportation infrastructure. The impermeable surfaces of transportation infrastructure result in the combined impact of reducing permeable surfaces and infiltration, while creating a network of conduits to take stormwater and contaminants far from the source.

Municipal stormwater programs are typically operated and funded separately from transportation departments, which can place the city or county at a disadvantage for developing multiple benefit projects, and may result in unforeseen, costly modifications after project implementation. Siloed management of stormwater and transportation program budgets may also result in funding inefficiencies, and potential political infighting over program priorities and expenses.

To reduce redundancies and improve efficiencies, some municipalities have combined their transportation and stormwater management departments. This integrated program approach allows for coordinated multiple benefit project development, as well as consolidated operations and maintenance. As discussed in Section 2.3.2.2, there is great potential to link urban stormwater programs into transportation-oriented projects, but it requires breaking down barriers and facilitating interconnectivity within municipalities. The benefit can be leveraging of program funding for a synergistic project, and it may result in improved grant funding opportunities because of a more competitive proposal, due to ongoing preferences for multiple benefit projects.

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[17]State Water Resources Control Board Resolution No. 2015-0077. December 15, 2015.

At the state level, Caltrans has a dedicated comprehensive Statewide Stormwater Program to maintain and improve runoff water quality, and assesses the effectiveness of the water pollution control activities. The program includes the implementation of best management practices, training courses and guidance, institutional controls such as the Adopt-A-Highway program, the Protect Every Drop public education campaign, and public outreach efforts in all 12 Caltrans Districts. The overall goal of the Caltrans Statewide Stormwater Program is to integrate appropriate stormwater control activities into ongoing activities, thus making control of stormwater pollution a part of Caltrans normal business practices. Caltrans has developed many resources to assist its staff and construction contractors to achieve this goal.

3.5.1 Senate Bill 1

The Road Repair and Accountability Act of 2017 (Senate Bill No. 1 (2017-2018 Reg. Sess.), Chapter 5, Statutes of 2017)) (SB-1) sponsored by Senator Beall provided additional funding to and increased the California Transportation Commission's role in several existing programs, and created new programs for the Commission to oversee. As one of the new programs created by SB-1, the Road Maintenance and Rehabilitation Program will address deferred maintenance on the state highway system and the local street and road system. The bill requires the California Transportation Commission to adopt performance criteria, consistent with a specified asset management plan, to ensure efficient use of certain funds available for the program. Expenditure priorities for the funds are basic road maintenance, road rehabilitation projects, and critical safety projects. These types of projects include projects with complete street components, including active transportation purposes, pedestrian and bicycle safety projects, transit facilities, and drainage and stormwater capture projects in conjunction with any other allowable project. The bill is discussed further in Appendix A.

SINCE 1996, MUNICIPALITIES HAVE BEEN LIMITED IN THEIR ABILITY TO IMPOSE PARCEL-BASED FEES TO SUPPORT THEIR STORMWATER PROGRAMS DUE TO VOTER APPROVAL REQUIREMENTS IMPOSED BY PROPOSITION 218.

4 STORMWATER PROGRAM FUNDING BARRIERS

Impediments to funding stormwater programs are varied and frequently require creative solutions. Since 1996, municipalities have been limited in their ability to impose parcel-based fees to support their stormwater programs due to voter approval requirements imposed by Proposition 218. Additionally, municipalities face competitive and complex grant application processes, conflicting priorities among water purveyors and municipalities, and challenging public and/or elected officials' perceptions.

4.1 PROPOSITION 218

On November 5, 1996, the California electorate approved Proposition 218, the self-titled "Right to Vote on Taxes Act." Proposition 218 added articles XIII C and XIII D to the California Constitution. Sections 6(a) and 6(c) of Article XIII D of the California Constitution made numerous changes to local government finance law. Section 6(a) established public hearing notice and majority protest requirements, and section 6(c) established voter or property-owner approval requirements. Fees for water, sewer, and

refuse collection services were identified as exempt from the requirement for voter or property-owner approval, however they are still subject to a public hearing.

Since passage of Proposition 218, property-related fee increases generally must be approved by a majority vote of the property owners subject to the fee or by a two-thirds vote of the electorate living in the affected area. Because flood control and stormwater services were not identified in the exemption that applies to water, sewer and refuse collection services, they are subject to the same vote requirement as most property-related fees. To impose a new property assessment (fee), the local government must secure the approval of a majority of affected property owners. A special tax requires a two-thirds vote of the electorate for approval. (See Ballot Measure Example box at the end of this section.)

Senate Bill 231

The court of appeal in Howard Jarvis Taxpayers Association v. City of Salinas (2002) 98 Cal.App.4th 1351 concluded that the term "sewer," as used in Proposition 218, is "ambiguous" and declined to use the statutory definition of the term "sewer system," which is part of the existing law as section 230.5 of the Public Utilities Code. Senate Bill No. 231[18] ((2017-2018 Reg. Sess.), Chapter 536, Statutes of 2017) (SB-231) was sponsored by Senator Hertzberg in 2017, and clarifies that the exemptions for water, sewer, and refuse collection services are inclusive of stormwater. Section 53751 (d) of SB-231 states that stormwater is "carried off in storm sewers, and careful management is necessary to ensure adequate state water supplies, especially during drought, and to reduce pollution." Section 53751 (h)(i) continues that "[n]umerous sources predating Proposition 218 reject the notion that the term "sewer" applies only to sanitary sewers and sanitary sewerage, including, but not limited to..." Public Utilities Code, Street Improvement Act of 1913, "and the L.A. County Flood Control District v. Southern Cal. Edison Co. (1958) 51 Cal.2d 331, where the California Supreme Court stated that 'no distinction has been made between sanitary sewers and storm drains or sewers.'"

SB-231 was developed in recognition of the existing stormwater intersection with water, sewage, and refuse, so the initial application of SB-231 will likely couple a stormwater management project with a water, sewer, or refuse benefit. The development of a dedicated stormwater fee has yet to be implemented, so the SB-231 clarification to the Proposition 218 process will continue to evolve as municipalities, and other wastewater systems, begin to utilize dedicated stormwater fees.

[18] Senate Bill No. 231 (2017-2018 Reg. Sess.), Chapter 536, Statutes of 201. An act to amend section 53750 of, and to add section 53751 to, the Government Code, relating to local government finance.

Ballot Measure Examples

Stormwater: The Orphaned Utility (Farfsing, 2015):

The quest for a regional stormwater fee in Los Angeles County began in May 2003 with the recommendation of a multi-stakeholder committee led by the American Society of Civil Engineers. The board of supervisors unanimously approved a motion requesting that the flood control district examine options for a stable, long-term regional fee. The effort required special legislation, AB 2554 (Brownley, Chapter 602, Statutes of 2010), which enabled the flood control district to impose the fee subject to the requirements of Proposition 218. The county worked with a large stakeholder group to initiate a rigorous outreach and fee development process, including a draft ordinance, project guidelines, an engineer's report outlining the rationale for the proposed fee and other documents.

Los Angeles County held protest hearings in January and March 2013 and received nearly 120,000 protests, representing 5.18 percent of property owners. The board tabled the measure, and arguments devolved the measure into a spiral of inactivity. Ironically, if the county's stormwater utility were operated under the same rules as its drinking water and sanitary sewer utilities, the fee could have been adopted. The county invested over $4.8 million in the failed process, with over $2.2 million spent to print and mail the protest hearing notices alone. This issue is not unique to Los Angeles County — the Contra Costa County stormwater fee failed at the ballot when 59 percent of the voters rejected the measure in May 2014.

Lessons Learned, Contra Costa County Flood Control & Water Conservation District (2013):

The Contra Costa County Flood Control & Water Conservation District outlined 20 lessons learned following the failed passage of their stormwater management related fee. The complete summation is included in Appendix B. The lessons learned shed light on the difficulties navigating the Proposition 218 process and the challenges of gaining public support. Lessons learned included:

- Talk to other agencies that have gone through the process during the planning phase
- Develop a good summation of the costs associated with the stormwater projects to better support the need for the funding
- Include a pro/con argument in the ballot packet, which was not required by law
- Start the public relations campaign well before the notice of public hearing
- Leverage the support of environmental nonprofit groups to share the messaging
- Identify a champion to connect with the communities and environmental groups
- Simplify the messaging down to three key talking points
- Know who the opposition is and be prepared to address their concerns or arguments
- Have proposed projects that the community can understand and connect with

4.2 Grant Application Process

Since many municipalities do not have a dedicated stormwater program funding source, grant programs are often targeted for stormwater projects. California grant programs are often funded through voter approved bond funds, which can include strict eligibility requirements, including a funding match. According to the March 2018 State Auditor Report, "cities may not be able to meet the funding requirements of grants, such as providing matching funds and committing resources for continued operation and maintenance. The most recent state grant program pursuant to a recent bond measure (Proposition 1) requires a minimum 50-percent match from local jurisdictions, with certain exceptions."[19] While cost-sharing (or matching funds) requirements present a challenge to some

[19] California State Auditor Report 2017-18, March 2018, p.3.

agencies, Proposition 1 specified that cost-sharing may be waived or reduced for projects that directly benefit a disadvantaged community or an economically distressed area.

The process of applying to grant programs can also be a challenge to many applicants; it is highly competitive with a rigorous application procedure. To develop a competitive application, the applicant must be able to describe the project components, verify the technical feasibility of the proposed project, and convey to the technical reviewers that the applicant is qualified to complete the proposed project. Due to a lack of in-house technical, financial, or managerial capacities, applicants frequently dedicate municipal resources to hire an outside consultant to complete the various elements of the application package to ensure the content is competitive. After incurring expenses associated with completing the grant application, the applicant faces the possibility that they will not be awarded funding. While applicants awarded a grant immediately benefit from new funding, they must still dedicate future resources to grant management, compliance with reporting and deliverable requirements, and a commitment to operate and maintain the improvements for a minimum of 20 years.

4.3 Securing Loans

In some cases, municipalities seek out loans to supplement financing of stormwater programs, such as low interest loans from the State Revolving Fund or other local bonds. However, these types of loans present their own set of challenges that may make them impractical as viable financing alternatives. One challenge is the large demand on loan programs resulting in oversubscription.

State Revolving Fund loan programs that could be utilized for a stormwater management project require a dedicated source of revenue for loan repayment. Because of Proposition 218 requirements, most municipalities do not have a stormwater fee in place or an alternative dedicated funding source, so the municipalities are unable to benefit from the low-interest loan programs that were developed to support such projects. For those agencies that have a dedicated funding source and qualify to apply for a loan from the state's Clean Water State Revolving Fund, they must also submit extensive documentation to prove their eligibility and ability to reimburse the state.

There are limited examples of communities that have developed Green Bond programs to fund stormwater projects; however, securing a Green Bond still requires a dedicated revenue source for repayment.

Green Bond Success Story

In July 2014, the District of Columbia's water and sewer utility (DC Water) issued its inaugural green bond to finance a portion of the DC Clean Rivers Project. The $350 million issuance represented the first "certified" green bond in the US debt capital markets and first municipal century bond issued by a water/wastewater utility in the United States. The issuance achieved its green certification based on the DC Clean Rivers Project's environmental benefits, which included improved water quality, climate resilience through flood mitigation and improved quality of life through promotion of biodiversity and waterfront restoration.

4.4 Agency Collaboration

Historically, stormwater runoff has been viewed as a nuisance or pollutant and stormwater management consisted primarily of building infrastructure aimed at removing runoff from parcels and streets as quickly as possible to address water quality concerns. Considering state efforts to promote

multiple benefit stormwater projects, water supply agencies could benefit from projects that use stormwater as a resource. However, some water supply agencies are cautious to link their water supply projects to stormwater projects subject to MS4 permits due to strict compliance deadlines or monitoring requirements. Other agencies, such as school districts that have land for multiple benefit projects may have concerns about environmental liability.

There is significant potential for water quality and water supply proponents to collaborate on stormwater capture projects. Assembly Bill No. 2403 ((2013-2014 Reg. Sess.), Chapter 78, amending § 53750 of the Gov. Code and discussed further in Appendix A) (AB 2403) updated Proposition 218 language to modify the definition of water to mean water from any source. The update was intended to make the connection between stormwater management and water supply; however, to date no community has used AB 2403 to justify a stormwater fee that increases water supply.

California continues to evolve towards a "One Water" approach to water demand in recognition of limited, unreliable water supplies and underutilized opportunities such as water recycling and stormwater capture and use. These efforts will assist in breaking down siloed water management interests to develop more interconnected relationships, including multiple benefit projects, towards a diversified water portfolio.

4.5 WATER RIGHTS

The perspective that stormwater is a resource and should support water supply needs in California is still evolving. Stormwater management projects that capture stormwater for water supply may overlap with complex water rights considerations, and the process of attaining a water right for a stormwater project may make moving forward with the project challenging. Aware of these potential complications, the state legislature has addressed a few of the legal obstacles to capture of rain or stormwater, and they are discussed below.

The Rainwater Capture Act of 2012 identified that use of rainwater collected from rooftops does not require a water right permit from the State Water Board. This legal hurdle was overcome and made it clear that sheet flow directed to rooftop rainwater capture systems does not require a water right, and addressed the concern of downstream claims or the expense of checking for impacts to downstream water right holders.

Assembly Bill No. 2594 ((2015-2016), Chapter 526, adding section 10561.7 to the Water Code, and discussed further in Appendix A) (AB 2594) authorized a public entity that captures stormwater from urban areas before the water reaches a natural channel, and in accordance with a stormwater resource plan, to use the captured water under certain circumstances.

The remaining regulatory challenges and linkages of stormwater capture and use with water right law will be further explored under the Stormwater Strategy project – Project 1a: Promote Stormwater Capture and Use.

4.6 UNDERSTANDING STORMWATER MANAGEMENT FROM A PUBLIC PERSPECTIVE

One main reason that ballot initiatives to adopt stormwater fees or parcel taxes frequently fail[20] is due to public perception of stormwater. Stormwater programs are not usually well defined, they are a low priority for municipalities, and they compete with other public services. There is also a general lack of recognition that stormwater should be treated as a utility similar to water, wastewater, and refuse. This is compounded by local elected officials and management staff that have a high turnover and little to no experience at the public works and/or planning level.[21]

In the 2017 U.S. EPA survey referenced in section 3.1.2, municipalities were asked "What is the help/support you are seeking?" The third biggest want or need, after more information on funding options (21%) and Proposition 218 reform (16%), was assistance in educating the public and local government officials about stormwater (9%).

In 2013, the U.S. EPA Office of Policy released a report titled *Evaluation of the Role of Public Outreach and Stakeholder Engagement in Stormwater Funding Decisions in New England: Lessons from Communities.*[22] The report identified that, while stakeholder support plays a critical role in the successful adoption and implementation of stormwater funding mechanisms, local officials' understanding of, and commitment to, a funding solution was also an important factor. By not engaging all the appropriate stakeholders in the process from the outset, municipalities failed to gain public and local official support for establishing a stormwater utility. Factors that influenced whether local officials adopted stormwater funding or utility proposals were:

- The extent to which decision-makers were seeking out a funding mechanism and providing strong, early support for a solution.
- Whether there was a local champion that made a compelling case early and often to decision-makers.
- Whether decision-makers were kept involved throughout the stakeholder engagement and/or program design process.
- The extent to which political risk was minimized for elected officials.
- The extent to which decision-makers were assured that program services would be adequate and that user fees would be fair, rational, and supported by their stakeholder constituencies.

There are only a few existing resources or guides available for stormwater program managers to improve public messaging. The University of Maryland Environmental Finance Center's Local Government Stormwater Financing Manual[23] identifies that local officials need a foundation to establish and grow "effective stormwater management programs that maximize the value and impact of every dollar invested in their communities." The manual provides local government officials guidance on

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[20] Success rate in California is estimated at less than 50%. "Shifting the Mindset; Funding Stormwater: The Next Great Challenge." Jason Drew, NCE. Presentation given at the April 2017 U.S. EPA Region 9 Finance Forum.

[21] Environmental Finance Center, University of Maryland, 2014. "Local Government Stormwater Financing Manual: A Process for Program Reform."

[22] U.S. EPA Office of Policy. June, 2013. "Evaluation of the Role of Public Outreach and Stakeholder Engagement in Stormwater Funding Decisions in New England: Lessons from Communities."

[23] Environmental Finance Center, University of Maryland, 2014. "Local Government Stormwater Financing Manual: A Process for Program Reform."

public messaging and lays out a five-phase process to change public policies to finance stormwater programs.

Beyond the guidance for conveying stormwater financing needs to the public, there remains a need to legitimize stormwater management as an essential public service.

5 STORMWATER FUNDING RESOURCES AND OPPORTUNITIES

Beyond the guidance for conveying stormwater financing needs to the public, there remains a need to legitimize stormwater management as an essential public service. The process for establishing that legitimacy may be similar to the efforts studied around the acceptance of potable water reuse, such as *Beyond User Acceptance: A Legitimacy Framework for Potable Reuse in California.*[24]

The funding of stormwater management projects continues to evolve with a variety of opportunities and approaches. There are funding programs developed to directly address stormwater quality through targeted projects, and there are alternative opportunities to fund projects that address stormwater quality as a component of a funded multiple benefit project, such as water supply. There are approaches that leverage new partnerships to achieve stormwater management benefits, too. The intent of this section is to summarize the direct and indirect opportunities to fund stormwater management projects across a variety of funding agencies and alternative approaches to achieving stormwater management objectives through partnerships. There may be additional approaches that have not been identified in this report. More information regarding the opportunities identified in this section is included as Appendix D.

The establishment of a dedicated funding source appears to be the key to leveraging multiple funding programs for municipal stormwater management projects. Without the dedicated funding source, communities cannot repay loans, provide adequate match for grants, allocate funds for the initial concept development, consider creative alternative approaches to funding stormwater management projects, or provide for the ongoing operation and maintenance of the installations.

5.1 FEDERAL FUNDING SOURCES

5.1.1 Clean Water State Revolving Fund

The federal Clean Water Act established the Clean Water State Revolving Fund (CWSRF) Program to finance the protection and improvement of water quality. Many of the projects funded by the CWSRF Program address wastewater discharge violations or enforcement orders from the Regional Water Boards. Every project is directly related to improving public health, water quality, or both. In 2016-17, the CWSRF executed 38 project agreements valued at $1.448 billion. As of December 31, 2017, the CWSRF had executed 17 project agreements valued at $443 million.

[24] http://pubs.acs.org/doi/pdf/10.1021/acs.est.5b00504

The State Water Board adopts the CWSRF Intended Use Plan (IUP) annually. This IUP reflects the State Water Board's guidance and program preferences for the CWSRF Program for the upcoming State Fiscal Year. The IUP for *State Fiscal Year 2017-18* was adopted on June 20, 2017 (Resolution No. 2017-0039).

In section II, part C. of the State Water Board Guidance, the IUP states that the CWSRF Program can help implement the Strategic Workplan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary by funding point and nonpoint source projects such as stormwater and dry weather runoff reduction from MS4s. In addition, the IUP references the State Water Board Resolution No. 2008-0030 that emphasizes sustainability as a core value for all Water Boards' activities and programs.

Following the approval of the CWSRF IUP for *State Fiscal Year 2016-17*, the California Stormwater Quality Association (CASQA) pointed out in the July 18, 2016 Water Quality Newsflash (No. 2016-15) that:

> *The FY 2016-17 Clean Water State Revolving Fund (CWSRF) Intended Use Plan (IUP) includes no loans for MS4s. State Water Board staff report that none applied. The CWSRF Program is intended to provide "low-cost financing statewide for wastewater treatment and recycling, non-point source, estuary, stormwater and combined sewer system projects." CWSRF accepts applications continuously, and a project does not have to be listed in the IUP to be approved for financing. Disbursements for the next fiscal year are estimated at $560M.*

According to the IUP for *State Fiscal Year 2017-18*, stormwater treatment and abatement measures are eligible projects, if they are publicly owned and required by an NPDES permit, but can also be funded regardless of ownership if they help implement the state's Nonpoint Source Program. (Note: the CWSRF identifies stormwater and abatement measures as a subcategory under Publicly Owned Treatment Works.) In addition, the IUP also indicates that "loan principal forgiveness" funds are available for green infrastructure-type stormwater projects, discussed in section 5.1.1.

5.1.1.1 CWSRF Green Project Reserve

The State Water Board has made principal forgiveness loans available for CWSRF Green Project Reserve (GPR) projects. GPR projects must address water or energy efficiency, mitigate stormwater runoff, or encourage sustainable project planning, design, and construction. All GPR projects must also be CWSRF eligible projects and may be either stand-alone projects or part of a larger project. GPR projects fit into four categories:

- Green infrastructure;
- Water efficiency;
- Energy efficiency; and
- Environmentally innovative activities.

The IUP for *State Fiscal Year 2017-18* states that a minimum of 10 percent (10%) of the 2017 Capitalization Grant (or an estimated $10 million) be provided to projects that meet the GPR criteria. The IUP for State Fiscal Year 2017-18 states that "the CWSRF has significantly more GPR demand than the minimum GPR requirement anticipated in 2017; therefore, the State Water Board does not plan to solicit additional GPR projects during SFY 2017-18." Although, the financing forecast tables in the IUP for *State Fiscal Year 2017-18* indicate that the Green Project Types fulfilling the requirement are primarily water efficiency with a small portion of energy efficiency. There was one green infrastructure project identified in the table, the City of Santa Monica, Sustainable Water Infrastructure Project (SWIP).

Prior to the establishment of the principal forgiveness, the State Water Board approved a $7,435,000 low-interest loan for the Lake Merced Green Infrastructure Project to be implemented by the Public Utilities Commission of the City and County of San Francisco. The Lake Merced Green Infrastructure Project was designed to convert Holloway Avenue, an urban residential street, which is nearly 100% paved, into a greener, more pedestrian and bike friendly corridor by incorporating multi-functional green infrastructure technologies. The design called for corner bulb outs containing bioretention planters to be installed between Ashton Avenue to just past Lee Avenue. Pervious concrete would replace the existing impervious asphalt/concrete pavement within the parking areas and direct roadway stormwater runoff into an underlying aggregate reservoir for storage and infiltration.

Since the Lake Merced Green Infrastructure Project is within the combined sewer area of the City of San Francisco, the loan repayment will be financed through the existing wastewater fee structure as a legally supported allocation of the funding because the project will alleviate stormwater flows that would typically be transported through the wastewater collection system. Besides the Lake Merced Green Infrastructure Project, there was no other stormwater management related project identified as having received a low-interest loan or principal forgiveness through the GPR.

5.1.2 Drinking Water State Revolving Fund

Established by an amendment to the federal Safe Drinking Water Act in 1996, the Drinking Water State Revolving Fund (DWSRF) provides low-interest loans, additional subsidy (principal forgiveness), and technical assistance to public water systems for infrastructure improvements to correct system deficiencies and improve drinking water quality for the health, safety, and welfare of all Californians. According to the DWSRF *State Fiscal Year 2017-18* IUP, California has received an annual average DWSRF capitalization grant of $82 million.

DWSRF and Proposition 1 Drinking Water projects are reviewed and ranked by categories and other factors that overlap with elements of a stormwater management project, where that project results in water supply enhancement, including, but not limited to:

Category A - Immediate Health Risk

- Severe domestic water supply outage(s) posing an imminent threat to public health and safety.

Category B - Untreated or At-Risk Sources

- Surface water or groundwater under the direct influence (GWUDI) sources that are untreated, not filtered, or have other filtration treatment deficiencies that violate federal or state regulations.
- Non-GWUDI groundwater sources that are contaminated with fecal coliform or E. coli and are inadequately treated.

Category C - Compliance or Shortage Problems

- Water quantity problems caused by source capacity, or water delivery capability that is insufficient to meet existing demand.

The potential to fund stormwater capture and use projects through the DWSRF remains an untested funding mechanism that could leverage the language of AB 2403, as discussed in section 4.4. The development of a DWSRF funding path for stormwater capture and use would also support the One Water evolution in California and create a viable financing option to support sustainable water quality and water supply.

5.1.3 319(h) Nonpoint Source Grant Program

The 319(h) Nonpoint Source (NPS) Grant Program is used to support projects that implement full scale, on-the-ground management measures or practices in alignment with watershed-based plans to address water quality problems in surface water and groundwater resulting from NPS pollution. The NPS Grant Program is comprised of funds from a U.S. EPA Clean Water Act section 319(h) grant to the State Water Board (Federal Grant), and from the Timber Regulation and Forest Restoration Fund (Timber Fund), if the Timber Fund is made available to the State Water Board through the California Budget Act. The NPS Grant Program anticipates approximately $4.5 million will be made available through the Federal Grant and the California Legislature may appropriate $2,000,000 for 2018/2019 from the Timber Fund.

Eligible CWA 319(h) Projects and applicants must:

- Implement activities that contribute to the restoration of NPS impaired waters through reduced pollutant loads or concentrations as called for in an adopted or nearly adopted TMDL;
- Address watersheds and impairments identified in the NPS Program Preferences;
- Be consistent with information addressing U.S. EPA's nine-element watershed-based plan; and
- Meet funding match requirements.

Projects within the boundaries of an NPDES permitted urban, area-wide stormwater program can be considered eligible provided that those projects are in areas that are not directly tributary to a Storm Sewer System, do not involve operation of a Storm Sewer System, and/or address land use activities specifically excluded by the permit.

Since the CWA 319(h) NPS Grant Program does not allow for MS4 compliance projects and alternative projects must address identified the NPS Program Preferences, eligible projects would likely be in more rural settings.

5.1.4 Hazard Mitigation Grant Program

The Governor's Office of Emergency Services (Cal OES) manages the 404 Hazard Mitigation Grant Program (HMGP) that is funded through the Federal Emergency Management Agency (FEMA) and authorized by section 404 of the Stafford Act, 42 U.S.C. 5170c. The goal of the HMGP is to reduce or eliminate long-term risk to people and property from natural hazards.

HMGP funding is available, when authorized under a Presidential major disaster declaration, in the areas of the State requested by the Governor. In response to recent federal disaster declarations, FEMA allocated the following amounts to the HMGP:

- DR-4301, DR-4305, DR-4308: January/February 2017 Storms – approximately $115 million
- DR-4344: October 2017 Wildfires – approximately $189 million
- DR-4353: December 2017 Wildfires – approximately $56 million

FEMA is encouraging communities to incorporate methods to mitigate the impacts of climate change into eligible HMGP funded risk reduction activities by providing guidance on mitigating flood and drought conditions. FEMA has developed initial guidance on flood and drought mitigation activities including green infrastructure methods, expanded ecosystem service benefits, and three flood reduction and drought mitigation activities: Aquifer Storage and Recovery (ASR), Floodplain and Stream Restoration (FSR), and Flood Diversion and Storage (FDS). FEMA encourages communities to use the guidance in developing HMGP applications that leverage risk reduction actions and increase resilience to the impacts of climate change.

5.2 STATE FUNDING SOURCES

5.2.1 Stormwater Grant Program

The Stormwater Grant Program (SWGP) was established after the passage of Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006. The mission of the SWGP is to promote the beneficial use of stormwater and dry weather runoff by providing financial assistance to eligible applicants for multiple benefit stormwater management projects.

After bond and program administration costs, Proposition 84 provided $82 million to the State Water Board for matching grants to local public agencies for the reduction and prevention of stormwater contamination of rivers, lakes, and streams (Public Resources Code [PRC] § 75050[m]).

In November 2014, Proposition 1 provided $200 million in grant funds for multiple benefit stormwater management projects (Water Code § 79747). After bond and program administration costs, approximately $186 million was made available for stormwater management projects.

During each round of funding under Proposition 84 and Proposition 1, the requested grant amounts typically far exceeded the available funds. Based on the Proposition 84 award summaries (available in Appendix D), approximately 60% of the grant applicants received funding. The dedicated grant funding of the Stormwater Grant Program may help communities with the development and implementation of a stormwater management project or provide the proof of concept experience in implementing stormwater management features, but the grants are not going to address statewide funding needs.

5.2.2 Integrated Regional Water Management Grant Program

Integrated Regional Water Management (IRWM) is a collaborative effort to identify and implement water management solutions on a regional scale that increase regional self-reliance, reduce conflict, and manage water concurrently to achieve social, environmental, and economic objectives.

There are several Program Preferences from the applicable IRWM Water Code that are consistent with the scope of stormwater management projects, including, but not limited to:

- Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government;
- Manage and Prepare for Dry Periods;
- Expand Water Storage Capacity and Improve Groundwater Management;
- Provide Safe Water for All Communities; and
- Increase Flood Protection.

The IRWM Grant Program Guidelines list eligible stormwater management project types including, but not limited to:

- Projects to reduce, manage, treat, or capture rainwater or stormwater;
- Projects that provide multiple benefits such as water quality, water supply, flood control, or open space;
- Decision support tools that evaluate the benefits and costs of multiple benefit stormwater projects; and
- Projects to implement a stormwater resource plan developed in accordance with Part 2.3 (commencing with § 10560) of Division 6 including Water Code § 10562 (b)(7).

5.2.3 Urban Greening Program

Signed into law in 2006, Assembly Bill No. 32 ((2005-2006) Reg. Sess., Chapter 488) (AB-32), also known as the California Global Warming Solutions Act of 2006, required a sharp reduction of greenhouse gas (GHG) emissions to 1990 levels by 2020. Recently signed into law, Senate Bill No. 32 ((2015-2016) Reg. Sess., Chapter 249)) (SB-32) reconfirmed the State's continued commitment to reducing GHG emissions by directing emission reductions to meet a target of 40% below 1990 levels by 2030.

The Urban Greening Program is responsible for reporting GHG emission reductions resulting from funded projects to the California ARB in accordance with an ARB approved quantification methodology. All projects are required to show a net GHG benefit and provide multiple other benefits. To quantify GHG emission reductions, projects must include at least one of the following project activities:

- Sequester and store carbon by planting trees;
- Reduce building energy use by strategically planting trees to shade buildings; or
- Reduce commute vehicle miles traveled by constructing bicycle paths, bicycle lanes or pedestrian facilities that provide safe routes for travel between residences, workplaces, commercial centers, and schools.

The connection of stormwater capture and use to reduce energy use was acknowledged in proposed Senate Bill 1328 (2015-16). SB-1328 would have authorized the State Water Board to expend moneys from the GGRF to provide grants to implement stormwater and dry weather runoff collection and treatment, wastewater, water recycling, and drinking water projects intended to reduce greenhouse gas emissions by decreasing the need to pump, transport, and deliver water to consumers.

SB-1328 was vetoed by Governor Jerry Brown on September 24, 2016 with the message, "Rather than creating a potentially duplicative program, I am directing the Resources Agency to work with the State Water Resources Control Board to ensure that stormwater projects are included in the Urban Greening Program."

While a green infrastructure project may have eligibility through the planting of trees, a stormwater capture and use project does not have an existing funding path through the current Urban Greening Program. The greatest obstacle to using GGRF allocations for a stormwater capture and use project appears to be the non-existence of an ARB approved quantification methodology for offsetting water supply transportation needs. As of the spring 2017, ARB was initiating the process, independent of the State Water Board, to develop a quantification methodology that may meet the eligibility requirements for a stormwater capture and use project, which would qualify stormwater capture projects for the GGRF in the future.

5.2.4 Caltrans Cooperative Implementation Agreements

In the current Caltrans NPDES Permit,[25] Caltrans is named as a responsible party in 84 TMDLs. To address these TMDLS, each year Caltrans is required to select and begin implementation activities within the highest priority reaches to achieve a minimum of 1650 compliance units. A compliance unit is defined as one acre of Caltrans' Right-of-Way (ROW) from which the runoff is retained, treated, and/or otherwise controlled prior to discharge to the relevant reach. Compliance units may be credited to Caltrans for the following actions:

- Stand-alone BMP retrofits;
- Cooperative implementation;

[25] 2012-0011-DWQ as amended by Orders WQ 2014-0006-EXEC, WQ 2014-0077-DWQ, and WQ 2015-0036-EXEC.

- Monitoring program-related retrofits;
- Post-construction treatment beyond permit requirements; and
- Other pollution reduction practices necessary to comply with the TMDL.

Caltrans may receive credit for compliance units by contributing funds to Cooperative Implementation Agreements and/or the Cooperative Implementation Grant Program. Caltrans may receive credit for one compliance unit for each $88,000 that it contributes. For Cooperative Implementation Agreements, the credit will be received when Caltrans transfers the funds to a responsible party, such as a municipality that seeks funds for a stormwater project. When funds are available, stormwater projects that meet the Cooperative Implementation Agreement selection criteria[26] are eligible to apply for Caltrans funding. The selection criteria assess the following for each project:

- Reach priority list[27]
- Number of pollutant categories treated (list TMDLs)
- Project stage and project schedule and budget
- Maintenance and operation costs
- Number of stakeholders benefitting from the project
- Amount of runoff from Caltrans ROW (if any)
- Lead agency
- Type of BMP to be built
- Number of acres treated

Cooperative Implementation Agreements are funded as part of Caltrans' stormwater operating expenses, rather than as an annual allocated amount. As a result, the amount of funds available for stormwater projects may vary significantly from year-to-year, and are thus not a reliable source of revenue. Based on feedback received from Caltrans, the next two to three years have limited to no funds available, so they do not anticipate entering into any new Cooperative Implementation Agreements within that timeframe.

5.3 Stormwater Project Partnerships

As described by U.S. EPA,[28] Public-Private Partnerships and Performance Based Infrastructure project delivery models are an alternative financial funding method for developing needed water infrastructure. Projects utilizing these delivery models span the water sector in size, location, and financial profile.

5.3.1 Public-Private Partnerships

Public-Private Partnerships (P3s) present a viable alternative solution to assist municipalities in financing urban stormwater retrofit projects and programs. P3s provide communities with a long-term contractual agreement between a public and private entity to provide a number of different delivery models based on desired community outcomes such as faster project completion, lower project cost, utilizing private sector capital, and various risk mitigations. The private partner participates in designing, completing, implementing, and funding the project, while the public partner focuses on defining and monitoring compliance with the objectives. Typically, the risks are distributed between the public and private

[26] http://www.efc.csus.edu/presentations/20170403-los-angeles/12-LA-Kontaxis.pdf

[27] Howard, 2015. "Approved Total Maximum Daily Loads Final Reach Prioritization; California Department of Transportation." State Water Resources Control Board.

[28] https://www.epa.gov/waterfinancecenter/leading-edge-financing-water-infrastructure#partnerships

partners according to the ability of each to assess, control and cope with them. Private-sector technology and innovation may provide enhanced public services through improved operational efficiency.

To comply with MS4 permit requirements, municipalities frequently need to install or retrofit large regional projects that capture large volumes of stormwater. These projects require significant up-front capital and ongoing, variable operation and maintenance costs that municipalities typically cannot account for within their budgets. By partnering with the private sector, municipalities can reduce program costs, reduce risks, and increase program flexibility. As part of their efforts to comply with the Los Angeles County MS4 Permit's requirements for stormwater capture, several Southern California's municipalities have successfully employed public-private partnerships in building green infrastructure for capturing and treating stormwater. (See Public-Private Partnership Example box.)

Stormwater Crediting Programs may provide another incentive for green stormwater capture and use projects from the private sector. Private property owners can build and "sell" their credits to municipalities who need to meet MS4 permit requirements for BMPs. For example, San Diego's Regional 2013 MS4 Permit[29] offers an Offsite Alternative Compliance Program. This includes an option for Priority Development Projects to satisfy onsite structural BMP performance requirements through an Offsite Alternative Compliance Program. It is described in the December 17, 2015 Water Quality Equivalency Guidance Document:[30]

Public Private Partnership Example

The City of Culver City, the City of Los Angeles, and Costco Wholesale Corporation partnered up to pay for installation of a sealed tank to capture stormwater runoff. The project is designed to capture runoff from 60 acres comprising of the Costco parking lot and adjacent drainage areas in Culver City and City of Los Angeles in the Marina del Rey watershed. A sealed tank will be installed in the public right-of-way underneath Washington Blvd. and sized to capture the 85th percentile, 24-hour storm event (5 acre-feet). Stormwater will be held in the tank for 72 hours before being pumped to the Hyperion Wastewater Treatment Plant, where it will be treated and sent to a Reclamation Plant. From there, the water will enter the City of Los Angeles' purple line to be used for irrigation and other usage. Estimated completion date is end of 2019.

Estimated cost is approximately $6.5 million:

- $2.5 million – City of Los Angeles
- $1.9 million – City of Culver City
- $1.3 million – Costco Wholesale Corporation
- $767,136 – Grant (2015 LA County Regional Park and Open Space District)

Culver City will fund their portion from a designated Capital Improvement Plan account via the City's general funds, and the operation and maintenance will be fully funded by the Clean Water, Clean Beach Parcel Tax (Measure CW[4]) funds passed in the November 8, 2016 Special Municipal Election by Culver City residents. (K. Young, Culver City, personal communication, August 8, 2017.) [4]http://www.culvercity.org/city-hall/information/election-information/ballot-measure-information/clean-culver-city

[29] California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100. January 7, 2016.

[30] Region 9, 2015. "Water Quality Equivalency Guidance Document." San Diego Region MS4 Permit Order No. R9-2013-0001.

"The Permit provides Copermittees the option of pursuing "offsite alternative compliance" programs. If instituted by a Copermittee, this allows project applicants within that jurisdiction and defined watershed management area to partially or wholly satisfy pollutant control and hydromodification flow control requirements through offsite projects that achieve a "greater overall water quality benefit." This Water Quality Equivalency (WQE) guidance document provides standards and guidelines to determine whether an offsite Alternative Compliance Project (ACP) will achieve a greater overall water quality benefit than a Priority Development Project (PDP)."

The DC Department of Energy & Environment implements a credit trading program on a voluntary basis. In the DC Stormwater Retention Credit Trading Program,[31] properties generate stormwater retention credits for voluntary green infrastructure that reduces stormwater runoff. Owners trade their stormwater retention credits in an open market to others who use them to meet regulatory requirements for retaining stormwater. Revenue creates incentives to install green infrastructure that protects rivers and provides other benefits.

On the community level, public-private partnerships can address more than a single infrastructure project. The 2015 U.S. EPA document *Community-Based Public-Private Partnerships (CBP3s)*[32] provides information to help decision-makers determine if a CBP3 is right for their community, and guides local governments and communities through the process of creating partnerships with the private sector. P3 models may provide communities with an alternative for the finance, design, construction, and operation and maintenance of green stormwater infrastructure, such as green streets. By incorporating community revitalization needs, with a focus on green infrastructure for stormwater management, a CBP3 model evolves the standard P3 contractual mechanism into a true partnership that focuses on improving water quality and a community's quality of life.

5.3.2 Performance Based Infrastructure

Performance-based infrastructure is an infrastructure delivery method that consolidates responsibility for the key aspects of a project's full lifecycle into a single, performance-based contract with a private partner. This can include elements of private sector financing and operational responsibility. Shifting both the financial risk and responsibility for long-term maintenance to the private partner creates a compelling incentive to ensure high levels of performance: both high-quality construction and proactive upkeep of the finished project.

Pay for Success (PFS) is another type of performance-based contracting framework that ties project success to government payout. PFS requires public-private collaboration focused on outcomes rather than outputs, and success of outcomes are determined by rigorous measurement after project completion. Investors bear much of the up-font risk, and the government pays only when defined results are achieved.

In some cases, stormwater funding has leveraged Green Bonds; municipal bonds that cover the risk of using green infrastructure to control stormwater runoff. Green infrastructure offers aesthetic benefits and is often cheaper than gray infrastructure, but it may also need more maintenance and may not perform as predictably; a risk that is problematic and may be unsurmountable for municipalities with

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[31] https://doee.dc.gov/src

[32] U.S. EPA Region 3, Water Protection Division. April 2015. "Community Based Public-Private Partnerships (CBP3s)."

limited resources. However, Green Bonds are becoming more common as the private sector becomes more interested in green jobs and other co-benefits of green infrastructure. For example, the District of Columbia Water and Sewer Authority (DC Water) recently created an Environmental Impact Bond (a type of Green Bond).[33] The $25 million tax-exempt Environmental Impact Bond, which was sold to private investors in September 2016, will fund a pilot green-infrastructure project within DC Water's Clean Rivers Project to improve water quality. Because the financial payout is linked to environmental performance, DC Water benefits from both the reduced risk of infrastructure failure and the improved water quality, while the private investors benefit from the Environmental Impact Bond tax exemption and possible returns on their investment.

5.4 Environmental Finance Center

The U.S. EPA funded Environmental Finance Centers (EFCs) deliver targeted technical assistance to, and partner with states, tribes, local governments, and the private sector in providing innovative solutions to help manage the costs of environmental financing and program management.

The EFC at California State University, Sacramento was established in September 2015 as part of the U.S. EPA EFC Network. The purpose of the EFC is to support and improve the capabilities of U.S. EPA Region 9 by providing resource tools and on-site training and technical assistance related to financing and planning of environmental and public health programs in areas such as drinking water, wastewater, stormwater, groundwater, and solid waste management. The goal of the EFC is to enable these entities to become capable of funding environmental and public health services, in the short term, and to be able to adapt to future needs as regulations, technology, and resources change.

The EFC assisted with the development of the Stormwater Finance Forums held in April 2017, which were discussed in section 2.3.2.3. The EFC operates as an assistance resource; it does not offer funding for project implementation. As the EFC continues to establish itself, the role it will play in supporting the funding of stormwater management projects will continue to evolve.

5.5 Water Finance Clearinghouse

U.S. EPA's Water Infrastructure and Resiliency Finance Center recently launched the Water Finance Clearinghouse,[34] a web-based portal to help communities make informed financing decisions for their drinking water, wastewater, and stormwater infrastructure needs. The Clearinghouse provides communities with a searchable database with more than $10 billion in water funding sources and over 550 resources to support local water infrastructure projects. It consolidates and expands upon existing U.S. EPA-supported databases to create a one-stop-shop for all community water finance needs.

The Water Finance Clearinghouse gives local decision makers an opportunity to search for available funding sources for water infrastructure as well as resources (such as reports, webpages, and webinars) on financing mechanisms and approaches that can help communities access capital to meet their water infrastructure needs. State, federal, local, and foundation funding sources and resources on public-private partnerships, asset management practices, revenue models, and affordability approaches are included in the Clearinghouse.

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[33] Martin, 2017. "A Pioneering Environmental Impact Bond for DC Water." Conservation Finance Network. Website.

[34] https://www.epa.gov/waterfinancecenter/water-finance-clearinghouse